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Principles of Architectural Planning For Forest Service Administrative Improvements

By W. Ellis Groben

PRINCIPLES
OF
ARCHITECTURAL PLANNING
FOR
FOREST SERVICE ADMINISTRATIVE IMPROVEMENTS

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EXPERIMENT STATION

These instructions have been prepared by W. Ellis Groben, Consulting Architect of the Washington Office, to guide architects and others in the Regions charged with the responsibility for the plan and design of buildings, such as Ranger Stations, Supervisor's Headquarters, Forest Nurseries and Experiment Stations.

The principles and instructions set forth herein are not to be construed by construction men in the field as a basis for altering duly approved Regional Office plans.

T. W. NORCROSS,
Chief, Division of Engineering.

PRINCIPLES TO BE OBSERVED IN PLANNING

The recommendations herein cited are based upon office and field observations.

Preface:

The Engineering and Architectural problems involved in the design and planning of buildings and other structures, together with their appurtenances, do not necessarily terminate with the structures themselves.

Construction plans and specifications, prepared in accordance with the universally accepted practice common to Engineering and Architectural offices include many features and facilities neither exclusively within nor limited by the exterior of the structures themselves.

It is entirely within the province of the Architect or Engineer to give full consideration not only to the buildings but also to their appurtenances. All portions of buildings, bridges and other structures, as represented by the plans and specifications or material lists prepared for their construction, are an integral part of the structures themselves as evidenced, in actual practice, by the fact that they are designed and built under one specification which comprehends the whole project.

It is the duty of the Architect, in cooperation with the Structural Engineer, to assume the responsibility for the planning and design, to coordinate the engineering, problems of construction, heating, plumbing, ventilation, etc., to determine the structural materials and to have them correctly written into the specifications of the buildings assigned to them or for which they assume responsibility.

How, otherwise, could properly coordinated buildings or groups of buildings be assured? Herein lies the difference between the draftsmen employed to prepare the drawings for a particular building and the Architect commissioned to design, coordinate and supervise the planning and construction of buildings and other structures.

Emphasis is placed upon these facts in order that the architects of the various Regional Offices may have a better understanding of the importance and necessity of comprehending the broader aspects of Forest Service planning problems, duties and responsibilities; problems not confined or limited to the single, isolated building.

1. Local Building Codes, Regulations, etc.:

State and city building construction codes should be observed. They have been established for safety and protection. The waiving of local regulations is unwarranted and undesirable.

2. Working Data:

a. Correct planning is dependent upon having adequate information pertaining to the site; location and size of the property, its topography, environment, possible natural scenic outlooks, relation to highway for access and exit, surveillance or control, soil conditions, orientation, available local building materials, other adjacent or proposed future buildings, approximate size of buildings within the alloted construction funds, etc.

Any one or all of these matters have a direct bearing upon proposed buildings, their exterior building materials and consequently their design, character and style. Site photographs are exceptionally useful.

b. For this purpose a form entitled "Questionnaire Covering Conditions at Proposed Sites of Forest Service Building Developments", Circular E-1783, has been provided as a convenient and uniform system of supplying essential information to the office charged with the planning and designing of Forest Service buildings.

3. Planning:

a. The broader aspects of the responsibilities of the Regional Architect call for the consideration of building developments as a whole. The comprehensive plan supersedes that of the individual building, in order and importance.

The preparation of plans, therefore, cannot be confined exclusively to the net area occupied by individual buildings except in the built-up areas of towns and cities and other sites where they occupy all the available ground within the property lines. Even under these circumstances the utilities, which must always be taken into account, extend beyond the property lines for public service connections.

To conclude otherwise would be unreasonable and presumptious because of the numerous vital factors, beyond the structural limits of buildings, etc., which, necessarily, must be taken into account in their planning.

b. In this category are topography, affecting the position of respective buildings as well as their relation to adjacent ones, the possibility of future building extensions and additions above the ground, equipment storage yards, sidewalk vaults, connecting tunnels and passages below grade, etc; sewage disposal systems together with their tile distribution fields; sub-soil drainage, rock requiring blasting, quicksands, etc.; utilities in general, including overhead or underground electric and telephone services; entrance features, porticoes, porte-cocheres, connecting open passages, entrance platforms, terraces, areaways, steps, entrance gates and other features too numerous to mention.

4. Objectionable Sites;

The first consideration of any site is its suitability for the particular development contemplated.

The following objectional site conditions, based upon actual field observations, are cited because they represent some of the most noticeable ones. Their recognition, as well as the existence of many others, has resulted in the previously mentioned questionnaire prepared to assemble the data necessary to guard against future similar mistakes.

a. Selection or acceptance of property because of its initial cheapness which, later, may involve many times its cost in eliminating surface water or other undesirable drainage conditions.

b. Low ground lacking natural drainage or where buildings, if erected upon it, would be subject to flooded basements due to high water table, adjacent streams, etc.

c. Property located within an area likely to be inundated by high water, covered by mud flows or subject to other erosive conditions.

d. Boggy ground; as a consequence of which the floors may sink below the outside grade due to superimposed loads, unless costly precautions are taken to overcome such conditions.

e. Property having inadequate opportunities for sewage disposal or inadequate water supply.

f. Selection of property having rock so close to its surface that blasting is required for foundations, basements, etc., in preference to other nearby sites where difficulties of this sort would not be encountered.

g. Properties necessitating the placing of buildings too high or too low for their surroundings, or in their relation to adjacent buildings, etc.

h. Properties, in cold regions, having northern exposures where snow and ice collect and remain all winter against the buildings, in preference to those with a southern exposure, free of such unsatisfactory conditions.

i. Acceptance or selection of sites obviously inadequate for ncessary early future expansion, which, when it occurs, results in their abandonment and loss of initial investment.

j. Properties requiring the erection of extremely high retaining walls to make them serviceable as building sites.

k. Properties should not be selected which are subject to erosion or which require excessive cut and fill, terracing and grading, etc.

Too frequently Forest Service building sites, upon later inspection and after construction work has advanced beyond its reasonable discontinuance, are found to have a high water table resulting in subsequent wet basements and no drainage or sewage disposal facilities. Again, where machine shops have been located on boggy sites, the floors, after having been used for some time, are found to be below the outside grade due to the weight of equipment, machinery, etc., imposed upon them. Site investigations should always be made in advance of any formal acceptance of such properties, resorting to test borings if necessary, to eliminate the possibility of undesirable site selections.

The preparation of plans should not be undertaken in cases where, due to not having made the necessary preliminary investigations, false assumptions or obviously unsatisfactory physical conditions form a part of the problem. Neglect in this matter invariably results in useless drafting, loss of time and subsequent expensive remedial measures.

5. Sloping Sites:

a. The general tendency to deliberately seek level sites as the simplest procedure makes it necessary to state that land need not necessarily be level. Sloping ground is often to be preferred because it reduces the amount of excavation and provides more abundant daylight for basement rooms. It is much more intriguing and picturesque, and in many instances possesses exceptional opportunities, possibilities and advantages. It is likewise true, greater ability and practical experience is required to visualize these unusual opportunities and to utilize their advantages.

b. Garages may very conveniently occupy basement space where the ground slopes sufficiently to provide entrance headroom.

6. Site Inspection:

To obtain the most practical results as well as for the proper conduct of the work the Regional Architect should have the opportunity of inspecting the site of a proposed project to familiarize himself with its physical conditions.

Where it is reasonably possible to make such advance site inspections the information obtained is of invaluable assistance in more rapidly arriving at the correct solution of the planning problems involved. Instance after instance is recalled where plans were being prepared with incomplete preliminary data, only partial surveys, second-hand verbal information, etc., for sites not twenty-five miles from the Regional Office.

7. Architectural Design:

Because the Forest Service functions over the entire country no one style is all-sufficient to fulfill the varying plan conditions nor appropriate in character to suit all regions.

Tradition, climatic conditions, environment, available local building materials and other important factors should be taken into account in preparing plans and elevations.

There are certain definite matters, such as expression of purpose, character, mass, scale, proportion, fenestration, color, exposed materials of construction, etc., which are fundamentals and upon which specific recommendations can be made.

See "Working Data," Section 2-a;
"Planning", Section 3-b;
"Objectionable Sites," Section 4-a to k, inclusive.

Buildings of a group should possess similarity of character and appearance whether or not they conform to any particular style. Frequently, worthwhile adjacent existing Forest Service structures, which may be retained, determine the character and style of proposed new ones.

On the contrary, in planning and designing new buildings, it is advisable to entirely disregard existing ones which are unworthy of retention or duplication.

Unless this progressive attitude is taken with regard to undesirable existing structures no advancement is possible in the older Administrative Developments, etc., where the erection of additional improvements, buildings, etc., is proposed.

8. Preliminary Sketches:

a. One carefully studied set of preliminary sketches, together with a possible alternative suggestion, should be sufficient for the ordinary project. Too many sketches indicate lack of careful study of any one scheme, inability to reach a decision, loss of time in useless drafting, etc., and lead to confusion in the selection of the best solution.

b. Do not attempt to design the elevations of a building until the plans are reasonably correct. Practical and workable plans lend themselves readily to good elevational design.

c. In preparing floor plans, always keep in mind a simple, economical roof framing in agreement with the layout of the building.

d. Various rooms should be planned of proper, comparative, relative sizes. Avoid long, narrow rooms or over-sized rooms.

e. Provide only essential, necessary rooms; omitting dressing rooms, dressing alcoves, sewing rooms, libraries and studies.

f. Where a Study or Work room is required, designate it as Office; with possibility of a separate exterior entrance.

9. Supervision:

Ample supervision is vitally important to insure the correct interpretation of the plans, etc., for the proper construction of buildings. The major criticisms offered in the field usually result directly from lack of or insufficient supervision. For good workmanship and construction there is nothing so efficacious as the knowledge that frequent, adequate supervision is being maintained.

The character, design and quality of all construction work is never any better than the manner in which it is detailed in the office and the care with which it is supervised in the field. This is axiomatic.

10. Field Changes:

The practice of altering plans in the field without the knowledge, consideration or sanction of the Regional Office, in which they have been prepared, should be discouraged and promptly discontinued. Modifications, alterations, changes, etc., undertaken by those inexperienced in scientific planning are invariably disastrous because they not only lead to further complications and difficulties, subsequent adverse criticism, etc., but disorganize the proper conduct of the work in the Regional Office drafting room itself. It is gratifying to observe that some Regions have definitely stopped this disconcerting practice, but several still tolerate it with consequent unfortunate results. The most outstanding and reprehensible practice of this sort consists of the deliberate reversal of buildings in the field by taking the plans prepared in the Regional Office, and, without its knowledge or sanction, holding them up to the sunlight to read and use them.

Plans cannot be correctly interpreted nor the buildings properly erected under these circumstances. Changes made in the field lead from one to another, and, finally, to confusion.

11. Materials of Construction·

a. For simplicity in plan and elevation, design and construction, consequent limitation of the number of trades involved, reduction of material lists and specifications, economy in initial cost and future maintenance, it is well to avoid all unnecessary combinations of materials.

For example; do not design a stone building with brick and wood porch posts, half timber and plaster gables, brick chimneys, etc. For stone buildings use stone generally except, perhaps, wood in the gable ends or in some other limited locations; if of frame, use wood except for chimneys.

b. Avoid the use of "half timber and plaster" because it is ordinarily none too permanent and is subject to frequent repairs and expensive to maintain.

c. Use indigenous or local materials wherever possible in preference to imported or extraneous ones, for buildings situated in remote locations, to avoid long hauls with consequent delays in construction.

12. Stone:

Local or nearly local stone is always to be preferred.

a. Stone setting: The character of face stonework cannot be fully discussed here because the subject has so many phases including surface and color of the stone itself, method of setting, type of jointing with respect to width, shape, depth and direction, color of mortar, ability and experience of the masons in any particular locality. However, it is highly desirable not to build stone walls in forest areas or other remote locations after the formal fashion of erecting stonework upon fixed property lines as in towns and cities.

b. Samples: To determine the exact character sought in the finished stone work, it is always a good practice to have several sufficiently large samples, say about 4' x 6' in size, erected elsewhere on the site for advance inspection, criticism and correction or modification before doing the actual stone work.

This procedure is a comparatively inexpensive and wise one, when the importance of obtaining masonry having the best appearance of its respective kind is taken into consideration. Samples are very satisfactory in obtaining the desired results, not only with regard to the character of the stone itself, but also the effect created by its jointing, its final pointing, surface and color of the mortar.

Once the masonry is determined in an approved sample, it becomes a definite model to be followed, thereby simplifying the construction work and its supervision by eliminating questions and doubts which continually arise on the part of the masons concerning the exact character of work desired. See "Random Rubble Masonry", Division of Engineering, 1937; Circular E-1813.

13. Cobblestones:

a. The use of small, round native cobblestones for building and retaining walls, chimneys, posts, piers, or in the masonry of portals marking Forest Entrances, etc., should be discontinued.

Their round, bullet-like effect is disastrous, being especially unsightly when the jointing is deeply raked out or when the mortar is white or black in color. Even when split and laid up with flat face exposed they still create an unsatisfactory impression. The use of pure black or red cement mortar joints only emphasizes their bad appearance.

14. Field Stones:

Native field stones or boulders often form an appropriate type of masonry if they have been split so their exposed faces, when laid up, are approximately even. When so split, they frequently offer a harmonious variety of color. They present the most pleasing effect when too great a variety or range of color is not indulged and when not spotted by conspicuously dark or light colored stones.

15. Stone Jointing:

a. Jointing must necessarily vary with quality, hardness, surface, bed, appearance, etc., of stone as well as the environment of the locality in which it is used. In general, deeply raked out joints are unsatisfactory. In locations, other than city or town sites, or where the native stone does not possess more or less smooth faces, it is preferable to lay it without too much mechanical character or regularity.

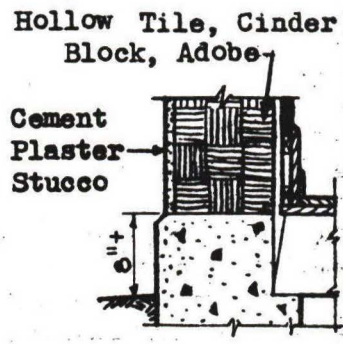
b. Do not use solid cement mortar to top out loose stone or other types of stone retaining walls. Always expose the stones on the top surface of such walls, using cement in joints only for the necessary solidity of construction.

c. Cement joints for field stone masonry should be flush and approximately flat or very slightly raked out; arranging the face stones to avoid cobweb jointing effects. White or very light colored jointing makes it more evident than the stones themselves and should never be permitted.

16. Brick:

Where brick is indigenous and its use a common local practice, this material may be safely employed if, upon serious consideration, it is deemed appropriate. Generally, however, exposed brick work is unsatisfactory for forested areas because in many localities, especially remote ones, it necessitates long hauls and competent bricklayers are not available.

17. Adobe, Hollow Tile, Cinder Concrete Blocks:



The use of these materials for exterior walls above grade has never been a common practice in Forest Service buildings. Their correct use is dependent upon an exterior coat of cement plaster for either preservation or appearance and they should start upon the foundation walls at the water table level, at least 8 inches above the finished grade. Adobe is erroneously considered a cheap building material because it is a clay product. Except for a very fe localities, the contrary is true.

18. Concrete and Cement:

a. Exposed concrete foundation walls are usually unsightly and inharmonious with the natural surroundings, except in sandy, desert or semi-desert areas or where no stone occurs locally. The reason for this is the smooth, mechanical manner in which the surfaces are finished.

b. Exposed faces of concrete foundation walls should, therefore, be veneered above grade with local stone wherever possible. Adobe or stuccoed buildings are exceptions.

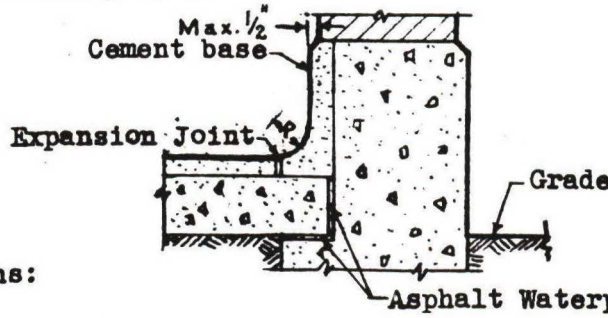
c. Large areas of concrete flooring laid upon the ground as in Garages, Basements, etc., should have properly located expansion joints to allow for expansion and contraction. Any cracked or injured blocks may then be replaced without disturbing the entire floor area. Too much emphasis cannot be given to the importance of this subject, because of the numerous instances, in Forest Service structures, of cracked floors resulting from either improperly located expansion joints, or from their omission.

d. Long stretches of concrete retaining walls should have expansion joints and weep holes for drainage at regular intervals.

e. Concrete Shop floors, likely to be subjected to excessive usage from equipment, tractors, etc., and heavy repair work, should be treated with a special floor hardener to protect them from defacement, injury and damage. There are a number of standard materials on the market to serve this purpose.

f. Cement Bases: Where cement bases are used around the interiors of rooms they should be constructed separately and not integral with the cement finished concrete floor. If built to a definite joint line, located about 4" from the wall, the laying of the concrete floor slabs is greatly simplified because the work may be done before or after the base is erected. If any floor slabs ever crack or become damaged, thereby necessitating their subsequent removal, it is a very simple matter

to replace them without disturbing the cement base. Cement bases should have a rounded edge at the top and an 1½" or 2" radius sanitary cove at the floor and should project only 3/8" to 1/2" from the face of the wall proper.



19. Foundations:

a. Where a series of vehicle openings occurs, as in Garages, Warehouses, Equipment Sheds, etc., built directly upon the ground and with no basement space, it is uneconomical in labor and material to build continuous foundation walls. Provide only masonry pier foundations under the supporting posts above. This applies likewise to small garages having a single large opening.

b. Buildings, including their porches, should never be erected upon piers with open spaces between the first floor and the ground. The effect is unfinished and the space becomes a harbor for rodents and waste materials, etc. Such buildings, lacking complete masonry foundation walls, are open to the weather, as the result of which the difficulty and cost of heating in cold weather is increased.

Neither lattices, wood screens nor logging are satisfactory substitutes for masonry foundations because they lack permanence and require continual maintenance.

20. Basements:

In several Regions, Basements have been gradually enlarged by increased facilities and accommodations until a point has been reached where it is a questionable practice. Therefore, carefully analyze each problem to avoid getting them excessively large.

a. Basements need not occupy an area equal to that of the first floor above unless specifically required. A part-basement is usually sufficient; it economises on excavation and avoids waste space. It may, possibly, contain the Garage.

b. Always provide adequate daylight for basements. See Basement Bedroom, Section 52-b.

c. Use a cement base and not one of wood in Basement Laundries and in Wash Rooms of Bunk Houses, etc., where laundry trays, showers, wash basins and urinals are located, as a protection against water. See Cement Bases, Section 18-f.

d. Open exterior Basement stairs should be avoided in connection with residences, especially in northern regions where snow prevails. Where absolutely necessary, they should have hinged double doors of wood as a protective covering.

21. Floor Levels:

a. In the design of small dwellings of the Forest Service type it is important to keep them low and intimate in character. Never place the first floor level too high above the finished grade and keep the roof eaves as low as possible. These fundamentals are important in designing elevations.

b. Storage buildings, garages, repair shops, barns, etc., should have the floor level 3" or 4" above the finished exterior service court or drive level at the building.

c. Dwelling first floor level need not be high above the finished grade where there is no snow fall of consequence or where no basement exists. Where heavy snow falls occur, or where basement windows are needed for light, the first floor level should be 1' 6" to 2' 0" above the finished grade.

d. Any one floor need not necessarily be all at the same level. Often, because of exterior grade conditions, it is imperative to adjust or change the levels to suit. This treatment is deliberately introduced in expensive, well-planned residences for variety and added interest. Care should be exercised, however, not to go to excess in this respect but conform to such changes of level as agree with exterior grades.

22. Dirt Floors:

a. Around the forge of a Blacksmith Shop it is desirable to have a dirt floor; not concrete. In doing blacksmithing it is the custom to drop one finished piece of hot metal to allow it to cool while taking the next hot piece from the forge to work upon it. Experienced blacksmiths prefer a dirt floor to one of any other material for this purpose.

b. For Implement and Motor Vehicle Storage Sheds, where heavy equipment is stored, dirt or well compacted cinder floors frequently prove very serviceable and cost much less than concrete. In using them in buildings of this kind a 12" or 15" wide border of concrete, including the concrete aprons at the openings, should be installed to retain the dirt or cinders in a solid, compact and permanent manner. Also, having a concrete border all around simplifies the placing of concrete in the dirt area later if it is found necessary or desirable.

23. Porch Floors and Walks:

a. Exterior cement porch floors should have a flagstone border, 12" or 15" wide, when used in connection with stone porch steps, etc. Flagstone for porch floors is preferable to other flooring materials.

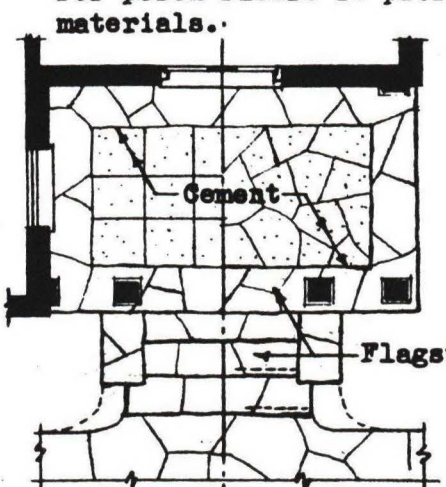


Diagram 23a Diagram 23c

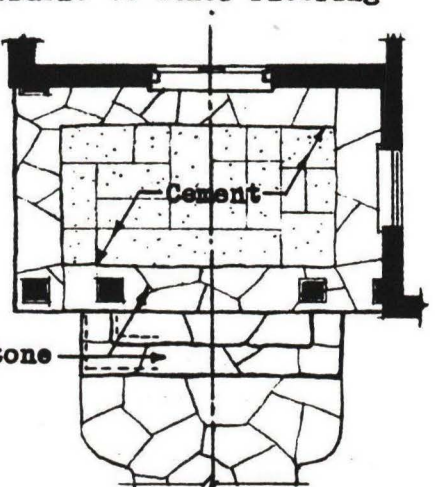


Diagram 23d

b. Cement finished porch or basement floors, should not be laid in large areas without expansion or through-joints cut through the full depth of the sub-concrete to create smaller areas. This practice will reduce the likelihood of cracking, etc.,

and aids in their removal for necessary repairs. Concrete floors, consisting of different sized rectangular areas laid out according to a definite, simple pattern are more formal than those having random shapes.

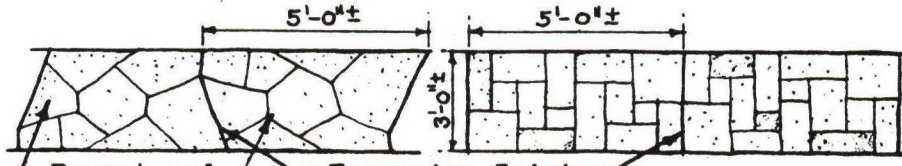
c. The latter, when laid with irregular joints in imitation of random shaped flagstones, are preferable.

d. Cement finished walks and steps, including city or town locations where the surroundings are entirely artificial, are never entirely satisfactory in appearance.

e. If, for economy, cement walks, etc., are unavoidable at Forest Service Administrative sites, then resort to false jointing on irregular lines in imitation of flagstones.

Do not combine flagstone steps or stone walls with cement walks, or vice versa, unless resorting to this false jointing.

Provide properly located expansion joints and slope all cement floors, walks, etc., for drainage.



Cement Walks

f. Never use red pigment for coloring cement porch floors, steps, walks, etc. It is particularly objectionable when used for porch floors because its red reflection on adjacent walls creates the impression of excessive heat.

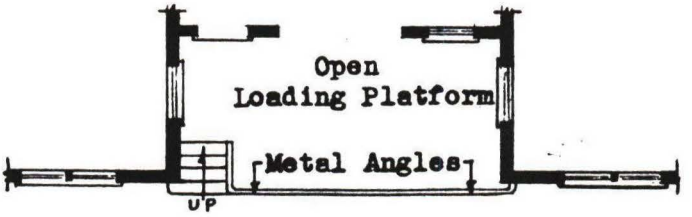
g. In certain instances, color effects of a very quiet and subdued character, may be used advantageously. Individual areas may be tinted in several different colors; some darker and others of a lighter shade, by adding a small amount of coloring matter to the cement. However, any attempts to indulge in the coloring of alternate areas should not be undertaken in the field without first submitting them to the Regional Office for approval, and, when sanctioned, they should

be carried out under its direct supervision and instructions to avoid any but the simplest, most dignified and limited coloring. Wild or bizarre effects should be absolutely avoided, and only such colors used as occur in the native stone of the vicinity.

24. Exterior Platforms, Steps:

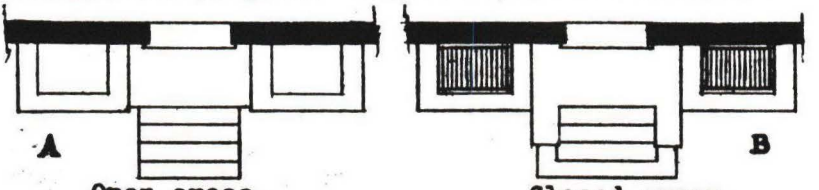
a. Exterior steps should not be made of wood; they deteriorate rapidly and are uneconomical due to maintenance and replacement costs.

b. Exterior steps should never project into the traffic portions of driveways, service courts, etc. Steps, needed at such locations, should be recessed. Steps to loading and unloading platforms should be built-in at the ends of them. See Section 80.



Service Court

c. Hazardous arrangements of entrance steps and platforms often thoughtlessly result from insufficient study of their correct planning. On other occasions they result from lack of exact grade datum. Entrance platforms, similar to Sketch A, five or more steps above grade, unprotected and thereby exposing its users to injury from accidentally stepping off, or having adjacent unguarded open basement window areas, should not be used. Sketch B, its correction.

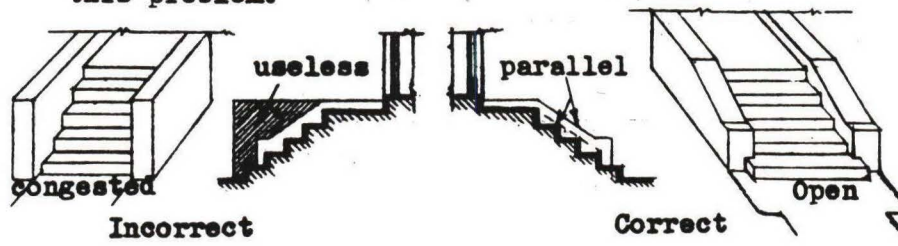


Open areas, unprotected steps

Closed areas, protected steps

Entrance steps should never be designed with high cheeks at either side. They are not only ridiculous in appearing to furnish protection where it is least needed, but also enclose the steps in a passage-like manner, making it necessary to pass

around the cheeks in using them and involving useless labor and material. Special attention should be given to this matter because of the numerous instances where this fault occurs. A comparison of the sketches will explain the correct solution of this problem.

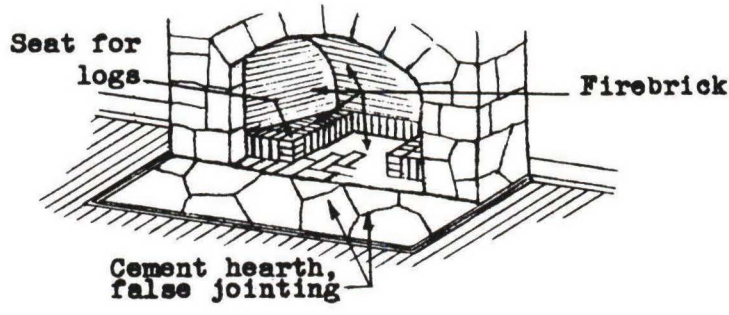


25. Fireplaces:

a. Use brick for facings and outer hearth only where brick is common to the locality; usually suburban or town locations. Where stone is indigenous and available, its use is preferable. Avoid tile hearths in remote locations where its use requires shipment from a distance. Never use black brick for fireplace facing because black is a funereal color. Fireplace back, jambs, log seats and inner hearth should all be of fire brick. Inner hearth should be of fire brick or soapstone, never native stone.

b. Arrange fireplace floor, as shown in sketch below, to avoid necessity of providing metal andirons.

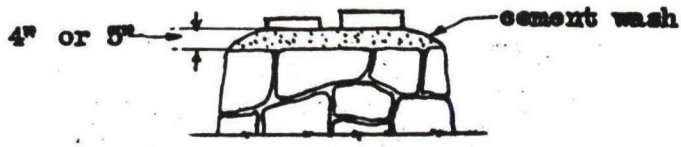
c. Cement outer hearths, composed of irregular shapes in imitation of flagstones, using false cement joints, are often quite suitable, easy to erect and economical. Depressions for false joints, 3/4" deep by 1" wide, may be made, filled with cement mortar. The Keystone of the arch of the fireplace opening should not drop noticeably below the arched soffit, but should conform to it.



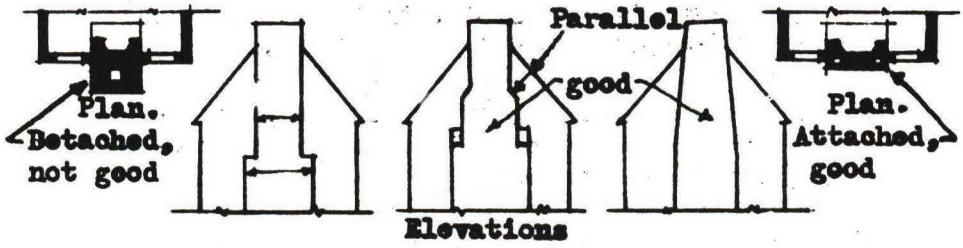
26. Chimneys:

a. Either build chimneys above roof entirely of stone, in preference to brick, to eliminate future maintenance, or else face the brick masonry with a stone veneer. Provide terra cotta flue linings for fire protection. Chimney flues should always have not less than 4" thick brick widths between them. Chimneys are designed either with the flues opening at the top and to the sky or on the two sides or the two ends; all with equal success, so far as the draft is concerned. However, when opening on vertical faces, practically no rain water enters and down-drafts are avoided; both of which occur in the former arrangement.

For the proportions of flues and throats to fireplace openings, consult "Fireplace Details", Improvement Handbook, Engineering, Washington. Bricks invariably disintegrate and loosen and the mortar dries out from heat and weather and falls from joints, especially at the top. Brick masonry should not be used for exposed surfaces of chimneys except for brick or stone buildings or where brick is indigenous and commonly used in adjacent buildings. Exposed red brick chimney faces never look agreeable in connection with white or buff painted frame buildings. If the use of exposed brick is obligatory for such buildings, then paint it to match color of paint used on vertical exterior wall surfaces. See Section 67-g regarding Painting. Cement caps, having an overhang for drip, are unnecessary, useless and always unsatisfactory in appearance. They create an especially bad effect when used on stone chimneys. No overhang for drip purposes is needed. A simple, bevelled cement top wash will be found both easy to erect and most satisfactory in appearance.

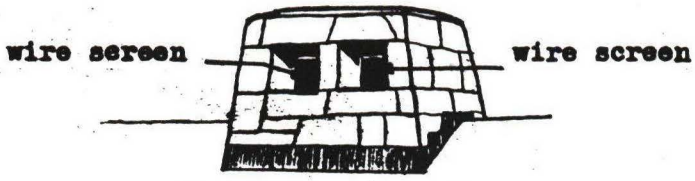


b. Stone chimneys, exposed to view on exterior walls, should be carefully studied for pleasing mass, proportion and silhouette and designed as a structural part of such walls rather than as applied features. Stone should be native or as nearly local as possible. Abrupt, quick changes in width, flat offsets, etc., are unsatisfactory.



27. Spark Arrestors:

Metal spark arrestors give an undesirable mechanical appearance to the topping-out of dwelling chimneys. It is recommended that masonry chimneys be built to a slightly greater elevation to allow side or end openings, across which 1/4" mesh, screen wire may be rigidly secured on the inside to cover openings, be used instead of the spark arrestor. This answers the same purpose, is not unsightly and involves neither initial expense nor future maintenance.



28. Fireplace Equipment:

a. If raised brick seats are built into the inner hearth, andirons are not needed; therefore are more economical.

b. Metal fireplace screens for arresting sparks are very necessary. The kind which have hinged leaves, very seldom seen, are the best because they require only to be opened to place logs upon the fire instead of removing the entire screen.

29. Cement Plaster:

Plastered exteriors are ordinarily associated with the Spanish, Mexican or other similar styles of architecture through common usage. The fundamental reason, however, is the success of its use in warm climates where not subjected to severe winter weather, frost action, etc.; those localities where the above mentioned architectural styles prevail. Therefore, it is necessary to take these practical phases, directly affecting exterior plaster and stucco, into consideration before deciding upon its use.

a. Exterior plaster ceilings of porches, etc., should be cement plastered, usually sand finish.

b. Often in stone dwellings, the stone wall face along the porch is plastered to give a smooth surface for greater comfort in its use.

c. For interior plastered garage and heater room walls and ceilings sand finished plaster is generally used.

d. Exterior stucco should consist of a cement plaster.

30. Textured Plaster:

White coated interior plaster surfaces not only appear unfinished but they are also very annoying because of the glare from them which causes eye strain. On this account and to enhance the appearance of the otherwise smooth, white plaster walls and ceilings, particularly where no wall paper or other applied covering is contemplated, textured surfaces of delicate, pastel shades are often used.

a. Textured, tinted surfaces may be gotten in several ways; one method consists of adding coloring matter to the plaster of the final coat itself and applying it in different ways to create a variety of surface textures. Only the most experienced plasterers can be relied upon to do this class of work. Ordinarily, in remote localities, they are not available. To obtain any desired plaster texture with the least difficulty a previously prepared sample of it should be sent to the job.

b. Another method consists of applying a ready mixed tinted texture wall paint over the final coat of finished white plaster; using an oil base product susceptible of subsequent cleaning with soap and water in contradistinction to a cold water paint. The latter are generally unsatisfactory because they calcimine easily and cannot be cleaned of dirt and grease.

To obtain any desired texture the average painter can successfully apply this material in accordance with the printed instructions of the manufacturers, who, in addition, supply a variety of colored, textured samples from which a selection may be made.

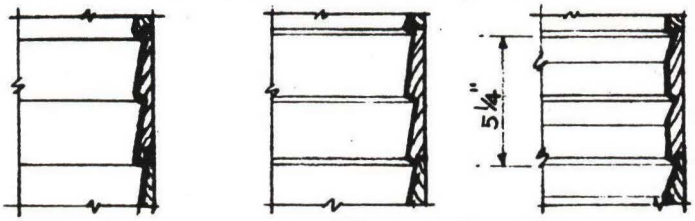
Where tinted textures are used two facts are to be remembered; first, to use a less conspicuous texture on the ceilings than on the walls. Second, if two tints are used, they should be preferably shades of the same color using the lighter one for the ceiling.

In certain styles, notably Spanish, Mexican, etc., exterior and interior textured plaster surfaces are both appropriate and traditional.

31. Wood Siding, etc.:

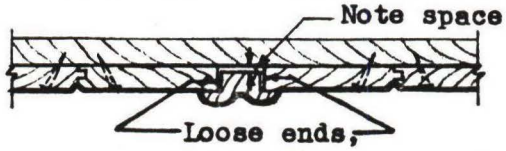
a. Wood siding should always be kept above the finished grade to prevent its deterioration. Horizontal wood siding should not exceed 8" in width for the best appearance of low buildings of 1 or 1-1/2 stories, such as those common to the Forest Service. Wood siding should not exceed 8" in width because, in greater widths, the shrinkage causes the lap joint to open and separate.

That type of wood siding, known as "drop siding", which is fabricated with two horizontal surfaces in 5-1/4" of width, should never be used. It reduces the scale in design and gives a miniature, toy-like appearance to building where it is used.



b. Vertical siding may be wider; 10" width preferable, rough faced or surfaced to best agree with other exterior wall material used in connection with it.

One very practical method of erecting vertical siding is shown in the illustration. The batten is rebated to cover the loose, un-nailed edges of the adjacent siding to allow for its movement. The siding is nailed only along its edge away from the batten.



c. Imitation log siding appears too mechanical and uniform unless some random widths are used at irregular intervals to avoid their otherwise monotonous uniformity. Random widths are now commercially available. In addition, imitation log siding should have an occasional coarse surface cut, using a draw-knife, to remove its uniform smoothness.

Logs: To be used only in heavily wooded areas where this type of building is customary. They make an excellent appearance, but the labor of cutting and fitting them is too expensive for general use. Where large diameter logs are used for the building proper, it is desirable to employ vertical rough faced siding with battens or else shakes in the gable ends, etc., beginning approximately at the ceiling level, to give an impression of less massiveness than when entirely of logs. In buildings, generally, the logs should be set horizontally, according to common practice, rather than vertically. See "Log Construction", Improvement Handbook, Engineering, Washington.

Special effects in design are often obtained by placing the logs upright. A simple method of overcoming the difficulties of using logs which taper rapidly is to erect vertical ones about eight or ten feet apart and fill between them with short horizontal lengths. A safe way to determine what diameter logs to use in log structures is never to exceed that of the average trees of the locality.

Note: Generally, log structures require interior furring and wall lining of some sort to make them weathertight and habitable.

d. Cedar Bark: In heavily wooded areas, buildings may be surfaced with cedar bark with excellent effect. When partly cut crosswise and then broken by hand, a rough, irregular edge results, which, when fitted in place, makes the jointing invisible. Very durable, easily and inexpensively repaired and economical for maintenance because no painting is required.

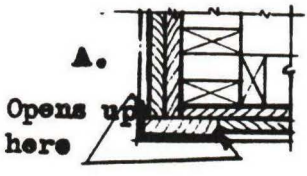
e. Cedar slab siding: Not very practical, whether vertically or horizontally placed, because bark soon peels off, creating an undesirable, shabby appearance.

f. Shakes: Cedar or redwood shakes make an excellent exterior wall surface material, retaining good appearance longer than wood siding painted with lead and oil

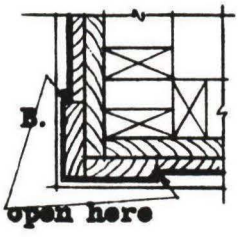
paint. Narrow widths should be used to avoid curling and may be placed random, double coarsed, etc., to give the desired effect. Preferably, not over 10" exposure to the weather. The lower the height of the building, the less the exposure.

g. Galvanized iron siding: Is very unsatisfactory in appearance, and, while its initial cost is cheap, its maintenance is expensive. Its use, either as siding or roofing, is inexcusable in any location except for solely temporary construction or where obligatory on account of absolute lack of funds.

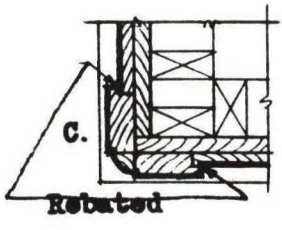
32. Corner Boards:



When a vertical wood corner board occurs on only one corface of a building, it is especially bad in appearance. (As shown in Sketch A). Wood corner boards, as shown in Sketches A and B, are not practical because the siding invariably opens up along side of them, thereby admitting the weather.



Symmetrical in appearance, but still possessing the same practical faults as just cited in (A).



Symmetrical in appearance and improved practically by having a rebate to cover intersection of siding as a protection against the weather. This method is followed generally as an accepted practice but still not entirely satisfactory.

None of these wooden corner boards are very satisfactory in appearance, particularly when seen in perspective, because they overhang or project beyond the siding.

Consequently, it is recommended that stock metal corner protectors be used instead. They are cheap, economical to erect and efficient in eliminating openings where rain and weather may penetrate by entirely covering and protecting them. They do not overhang and, after painting, are scarcely noticeable.

33. Plywood, Masonite, Nu-wood, etc.:

a. Fabricated or processed wood products frequently offer a good, cheap solution of the problem of interior wall and ceiling finish. Random width, "V"-jointed fabricated boards, having a range of colors and including stock cornice and panel moulds, are available.

b. The ease and speed of erection, coverage, etc., offered by these materials, afford a very much lower labor cost than the use of plaster. For offices they prove very serviceable; often avoiding delays in construction, etc., caused by waiting for plaster to dry thoroughly before erecting wood trim, etc.

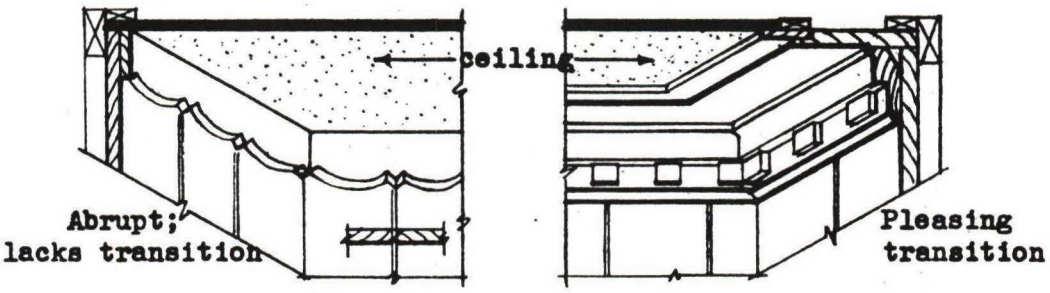
c. For appearance, "V"-jointed intersections are to be preferred to the stock 3/8" x 2½" cover moulds.

34. Knotty Pine:

a. Wainscots of knotty pine are sometimes very satisfactory for wear and appearance in offices, mess halls, lounges, etc. The use of knotty pine is a fad. The knots of this wood, being of circular form, create a very distracting, revolving effect. Plain grained woods produce more refined, more dignified effects wherever used and especially where there is a predominance of wood as in wainscots. Knotty pine should be used only in rooms occupied occasionally or for part time, or where the occupants stay only a short time. Very annoying, as the result of eye strain, to employees forced to continually occupy rooms wainscoted with it. Do not use wood ceilings in connection with the usual Forest Service building. They are beautiful in large rooms of a monumental, public or semi-public character.

b. A wood ceiling for the average room absorbs too much daylight, thereby making it dark and apparently reducing its size. A knotty pine ceiling in connection with a similar wainscot produces a superfluous effect. Therefore, a plaster ceiling is better because it reflects more light.

Wood wainscots terminating 1'-6" or 2'-0" below the ceiling, in rooms of average size and ceiling height, are to be preferred to continuing the wainscot to the ceiling itself because the transition from the wood to the plaster is less abrupt when occuring in one plane rather than at the intersection of two planes. Wood wainscots should have plain, simply moulded wood caps whether terminating at or below ceilings. Where wood wainscots continue to the ceiling a flat wood ceiling border produces the best form of transition and the most pleasing effect.



It is well to remember that wood cornice moulds, consisting primarily of horizontal lines and few vertical ones, are much less disturbing than those which are serrated.

A wood like knotty pine vibrates because of the numerous round knots; therefore, never use a vibrating, serrated wood capping or cornice with it, always use a quiet one. For appearance, V-jointed intersections are to be preferred to the stock 3/8" x 2½" raised, cover moulds.

c. Knotty pine wainscots may be imitated cheaply by V-ing shiplap pine siding. Knotty pine, purchased cheaply because of missing knots, may be easily repaired by forcing limbs into the holes until snug and marking them at the face and back of the board. When sawed and placed in position they afford excellent repairs.

Loose knots may be securely fastened in place by tinning over them on the rear of the boards.

35. Wall Linings:

The interior faces of exterior walls of frame Repair Shops, Warehouses, Garages, etc., should never be left unlined because they not only look badly but add greatly to the cost of heating. Good construction requires that a wood lining be used, and, in cold climates, that the spaces between the studs be thoroughly packed with an approved insulating material as a protection against the cold and to insure economy in fuel consumption.

For Repair Shops and other structures built of frame, in which heavy work is done, it is important to cover the interior wood lining of walls and partitions with 24 gauge, flat rolled, sheet galvanized iron for a height of about 4' 6" to afford protection from both ordinary wear and injury.

Shop walls and partitions finished with a metal dado of this kind, usually painted a maroon or steel gray color to conceal finger prints, dirt and grease marks, may be easily cleaned and kept in a presentable manner at all times. See Section 68-e.

36. Roofs:

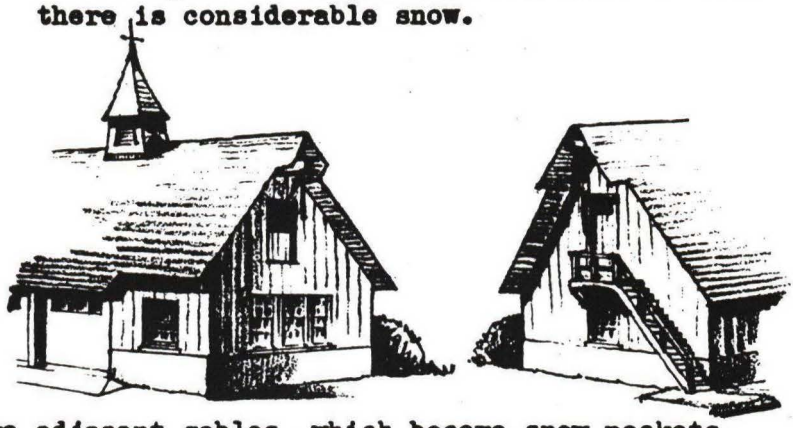
a. The conspicuous part played by roofs in the design of buildings should not be over-looked. It is such an important matter that, in the past, it has established a style like the Mansard. While, in principle, simplicity is highly desirable the ordinary, plain, rectangular uninterrupted roofs of Warehouses, Repair Shops, Garages, etc., are without interest, and wherever possible, something should be done to create more pleasing lines.

b. Roofs should maintain similarity of character; that is, do not combine flat and gable roofs in the same building, or group of buildings, but conform to roofs of the same general shape.

c. The following suggestions are offered:

1. Continue roof over cat-head.
2. Create a break in the eaves by continuing the roof to a lower elevation over the large door openings. The projection of the eaves, therefore, will be increased at this location.

3. Roof ventilators, an essential feature often disregarded in barns, repair shops, etc., may be introduced and treated in an architecturally pleasing manner.
4. Off-setting of end walls to produce a special feature having a corresponding broken gable end roof line above.
5. Exterior stairways to second story storage spaces may often be found of practical service. This motif invariably produces an interesting treatment, even in the north where there is considerable snow.



d. Two adjacent gables, which become snow pockets, should never be used. Even in the south where snow does not occur, two adjacent gable ends, in the same plane, do not lend themselves to good design.

e. Building paper should be placed on all roof surfaces, over the rough sheathing, before applying shingles, slate or tile, to act as a protection against the weather. Without it strong winds will blow snow into the attic spaces.

Porches of the shed roof type, when attached to the gable end of a building, so characteristic of buildings around Sonora, California, are very displeasing in appearance on account of the opposition of roof slopes.

37. Roofing:

For other than flat or approximately flat roofs.

a. Wood shingles: Various standard types and qualities are available. Narrow widths are most serviceable, because wide widths frequently curl, twist and split. It is, therefore, wise to mechanically split them before laying to avoid this difficulty. They may be laid at random, double coarsed, etc., and usually give the best results when exposure is reduced to 4½" or 5" to the weather. Whether stained or natural in color depends on immediate environment, surroundings, general color scheme of the building, etc.

b. Composition Roofing: Roofing materials in this class, if used at all, should be confined solely to temporary structures because of their lack of permanence. Exception (See Flat Roofing, Item 37 - d).

c. Tile Roofing: Flat and Spanish tile, half round, reddish in color, are acceptable. Their use should be confined, however, to southern regions having a generally mild, warm climate with abundance of sunshine, and where their use is common, local practice.

d. Flat Roofing: Prepared built-up, ply roofing may be satisfactorily employed, when carrying the usual guarantee, for "adobe" dwellings, and city or town office, storage, warehouse or repair buildings having relatively flat roofs.

e. Galvanized iron is very unsatisfactory except for temporary buildings. There is nothing in its favor but its cheapness. (See also 31 - g).

38. Gutters & Flashings:

a. Gutters: Built-in or box gutters have not been used on Forest Service buildings to any great extent. They are very serviceable, inconspicuous and do not hide the cornice as a hanging metal gutter does. Their use is often recommended in place of hanging gutters. Contrary to the general practice of installation, metal gutters do not require grading. The rain water cannot do otherwise than flow out of a hanging gutter, even though horizontal and level, because of its outlet at the conductor end. Level, hanging gutters do not disfigure a cornice like a graded or sloping one

does. The elbow between the gutter and the conductor should be set at an angle and not horizontally.

b. Flashings: Unusual care should be taken with the metal flashings between the roof and the chimney by building their top edges into the masonry joints, stepped with rake; internal angles of steppings at least 4" above finished roof.

39. Sash and Door Fitting:

Special care should be taken to fit window sash and exterior doors accurately and tightly in the best manner known to carpentry, to make them weathertight. The lumber from which millwork is made, if not thoroughly seasoned, develops shrinkage in the fabricated pieces which becomes worse when carelessly erected. The infiltration of cold air in winter around sash and doors produces uncomfortable drafts and very appreciably increases fuel consumption. In using casement sash, only the type having rebated meeting rails and sills should be used to aid in preventing conditions of this sort. Doors should be rehung tight up against the head and provided with a wood threshold to fill the opening at the sill. Many items of stock millwork, used because of initial cheapness, are uneconomical when the cost of maintenance is taken into consideration.

40. Exterior Doors:

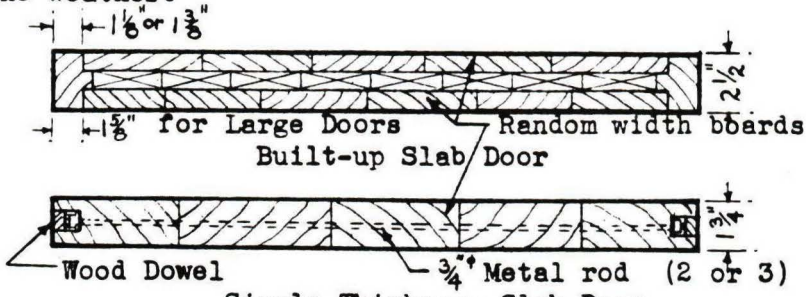
a. Exterior man-doors need not be higher than interior ones. Glazed upper panels are often desirable and usually necessary, especially where there are no adjacent windows or sidelights.

b. Never provide two front entrance doors to a single dwelling or small office building; nor a single, common entrance to a duplex building used for dwelling purposes.

c. Do not use delicate "Colonial" or other panelled type doors on exterior of dwellings in rural locations. "Slab doors" of vertical boards, having 1-1/8" hard wood strip at top and bottom to prevent weathering of end grain, with simple glass panel, are preferable.

d. Slab doors, for exterior openings, are simpler and more appropriate than panelled doors for the majority of Forest Service buildings. They should be constructed of a wood veneer of 7/8" vertical boards, equal or random width, on each face over a built-up

center core. This type of door is free from twist or warp. Around the edges there should be an oak or other hard wood strip, which, particularly at the top and bottom, protects the end grain of the vertical wood slabs from deterioration from exposure to the weather.



Single Thickness Slab Door

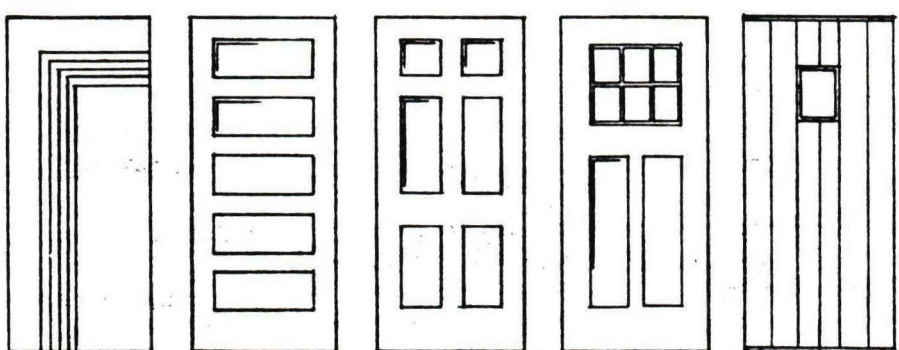
Another form of slab door consists of single thickness vertical boards held together by iron cross rods placed 8" or 10" from the top and bottom. For larger doors a third iron cross rod is used at the center.

The rods, having a nut at one end and a nut and washer at the other, are let-in from the jamb faces and wood plugged to conceal the metal. This type of door is more likely to twist and warp than the previously described built-up slab door.

e. Panel doors: Cross-panel exterior doors are commonplace and never satisfactory in appearance for exterior openings on any building because of their resemblance to stock interior doors.

Exterior doors, having a series of cross panels, lack character, proportion and composition.

Instead, vertical panelled exterior doors should be used because their arrangement conforms to the general vertical proportion of the opening itself.



f. Garages, Store & Warehouses: For better weathering, longer life and to eliminate the conspicuous "X" and "Z" and other structural bracing shapes so disturbing and unsightly, particularly when emphasized by paint of a color different from that of the door proper, it is suggested that, hereafter, the bracing be placed on the inside. Present doors, having exposed bracing, should be rectified as rapidly as they require repairs or replacement.

g. Garage Doors: Large doors at vehicle and garage entrances, hinged to swing out, should not be used where snow or high winds prevail.

The practice of hanging sliding doors on the exterior face of Garages, Shops, Store and Warehouses, etc., should be discontinued because the suspension hardware, metal hangers, track, etc., soon rust, even when under overhanging eaves, necessitating their early replacement. Also, with the end grain of the wood exposed at the top and bottom, the doors themselves soon deteriorate, requiring repairs and replacement, when hung on the exterior.

Provide a separate man-door, to enter buildings having large vehicle doors, either in one of them or as an independent entrance door.

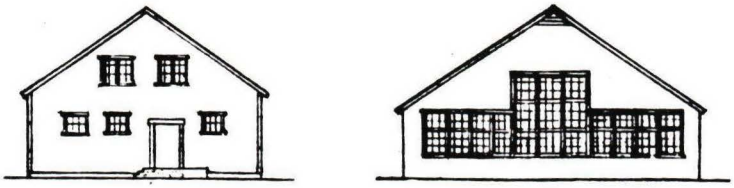
41. Daylighting:

a. Daylight is abundant, inexpensive and always available during the regular, ordinary working period and, except for cloudy days, it is the most dependable light known. Ample daylight avoids the continual expense of electricity which is not cheap in many localities.

Remember that abundant daylight is a prime factor to be considered in all planning and particularly in connection with work spaces. North light is preferable for precise work.

The distance daylight penetrates into rooms lighted from openings in side walls depends upon the height of both the heads of the windows and the ceiling above the floor.

The amount of daylight depends upon the glass area. It is essential to bear both these facts in mind to obtain sufficient and adequate daylight.



Insufficient glass Ample glass

Repair Shops

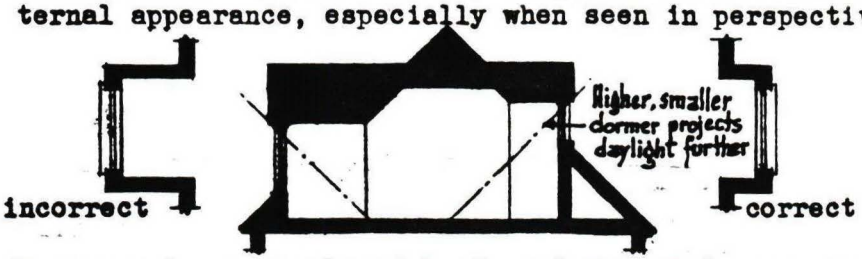
No building looks more ridiculous than a modern industrial plant having dirty, grimy windows; indicative of inefficiency and poor management within.

Wherever possible, rooms in which especially careful work is to be done, should be located at the corners of buildings to obtain the benefits of daylight from glass areas in two walls. The only exception to this is where it is imperative that, for certain kinds of work, the daylight should come from one direction only.

b. Repair Shops, Laboratories, etc., should be designed to indicate their fundamental purpose at a glance, to accomplish which ample glass areas should always be provided. Next in importance, after providing the proper glass area, is to keep it continually clean so that it may be 100 percent serviceable.

42. Dormer Windows:

a. Keep them as small as possible in both plan and elevation. Excessive floor space in small, single dormer window recesses serves no purpose and invariably creates dormers which are excessively large and massive in external appearance, especially when seen in perspective.



b. Roof construction should be framed around dormers to admit the maximum of daylight. To place dormer windows directly upon a roof, without framing or heading the rafters around them, entirely defeats their purpose. Dormers of this type were observed in the roof of a Repair Shop, ostensibly planned to furnish additional daylight, but which, in reality, actually cast shadows from each roof rafter across the shop floor.

That it should be necessary to call attention to such an unually absurd matter seems scarcely possible.

c. Where it is desirable not to attract undue attention, it will often be found advantageous to use a wood frame and glazed sash set parallel with and raised only about 4" or 6" above the roof.

43. Gable Windows:

In gable ends never use square windows set diagonally. Likewise, small, circular windows are too disturbing and can rarely be used successfully in small buildings.

44. Basement Windows:

a. Basement windows should be of ample size. Even for rooms used solely for storage purposes the sash should be two lights high instead of only one.

b. To hinge cellar windows at the top, with an eye fastened into either the bottom of the floor joists or the basement ceiling into which to place a hook to hold them open, is not good practice. Ceilings are too high to reach, especially for women, and, operating windows in this fashion, usually results in dirty, dusty hands, etc.

Wood basement sash, if not double-hung, should be hinged on the jamb to swing in the customary manner.

Stock pivoted steel sash and frames are available which provide excellent ventilation and possess the added feature of a removable sash; an advantage where the opening may be needed to take things in or out.

45. Trap Doors:

a. Located in ceiling for access to Attic space and, where no Basement exists, in first floor for access to space between grade and under side of the floor construction.

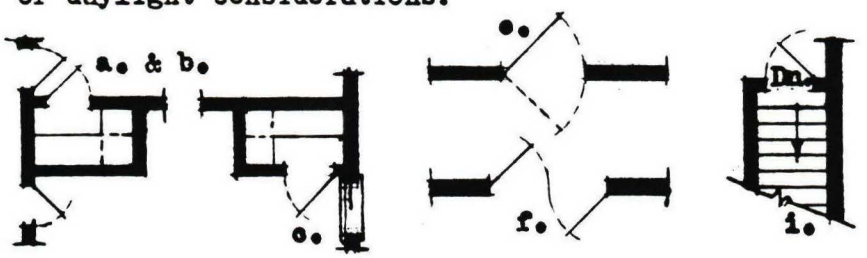
b. Provide small access doors for the practical convenience of repairing the plumbing service in connection with bath tubs.

46. Door Swings:

a. Doors should open into rooms from hallways; not the reverse. Where two adjacent doors occur they should swing back to back.

b. Room doors should be located, generally, as close to the corner of the room as possible and be hinged on the jamb toward the corner to avoid the necessity of passing around them in entering and to give the maximum usable wall space beyond for furniture, etc. The closet door should be placed, preferably, at one end to permit of a series of cross or end shelves, floor to ceiling, at opposite end.

c. A closet or other door, in a partition near an exterior wall, should swing against the latter in spite of daylight considerations.



d. Closets should, wherever possible, be located to utilize the darker, central portions of a plan.

e. Between kitchens and dining rooms of residences, the doors should be double acting, small panel of glass at eye-line, hinged at floor and arranged to stay in a fixed position when revolved 90 degrees.

f. Between kitchens and dining rooms of mess halls, hotels, etc., the doors should be double, opposite swings, hinged at far, opposite jambs.

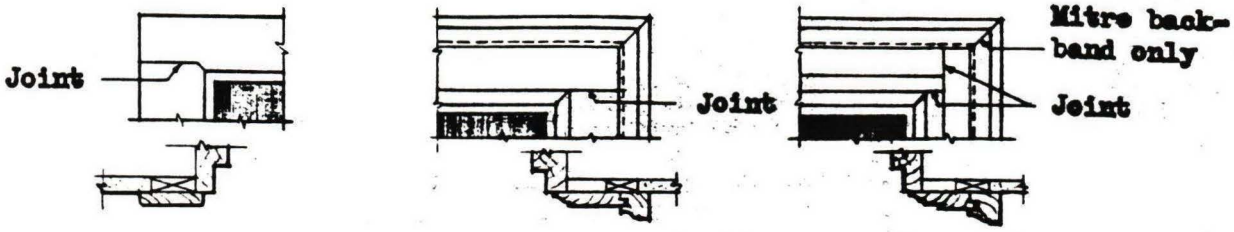
g. Exterior doors of public and semi-public buildings, including their vestibule doors, should either be revolving doors or else swing outward.

h. Exterior doors, residences, including porch or casement terrace doors, should swing in.

i. Door, at top of a basement stair, should swing into the room. For garage doors, see Sections 40 f & g, 48 b and 76 b.

47. Door and Window Trim:

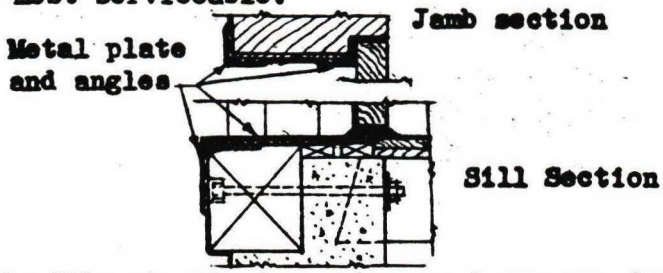
a. Plain, flat wood trim should never be mitered because it tends to open at the miter. The trim across head of opening should be placed on top of jamb trim with horizontal seat, using trim not ploughed-out on the back. Moulded back-bands only to be mitered.



48. Metal Guards and Sills:

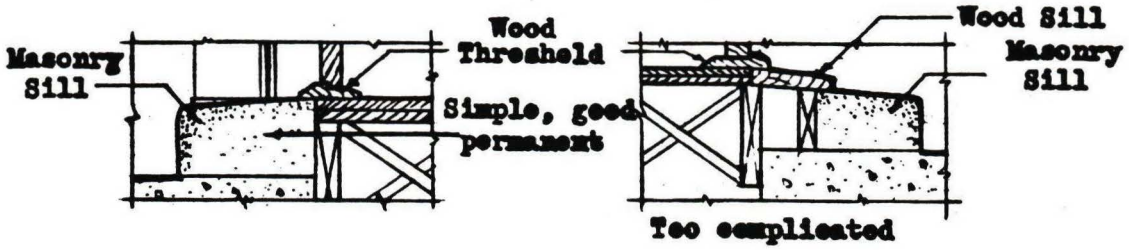
a. At vehicle entrances and at doors from loading platforms, etc., metal jamb guards are essential for the protection of either wood or masonry jambs against injury or defacement. Either metal angles, approximately four feet high, or a metal plate and angles may be used as best suits the particular conditions.

b. Likewise, for the protection of the exterior edges and faces of either wood or masonry platforms, bumpers, etc., metal plate and angle sills, or metal plate sills, having a channel face, will be found the most serviceable.



49. Sills:

Wood sills at exterior entrance doors are impractical, subject to deterioration and replacement, and should not be used in buildings having masonry foundation walls. A combined wood sill and wood threshold, so often used, is not permanent and is usually a source of danger from stumbling. After foundation wall is completed build masonry up as a separate unit, for width of rough door opening, to form a permanent sill, provided with 1/2" wash toward exterior. Narrow wood threshold, rebated for the door, may be used for weathering purposes, as a wind stop and joint cover.



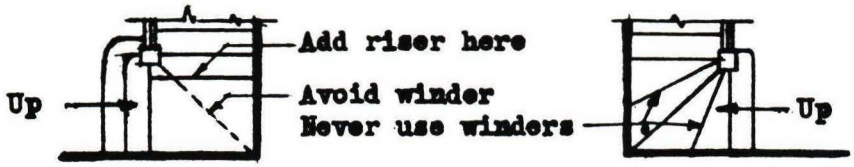
50. Stairways:

a. Main stairs should receive daylight from windows and should not be located in dark, central hallways having no daylight.

b. Try to plan the basement stair under the main stair leading to upper floors as an economy of space and located so that it may be reached without having to pass through other rooms.

c. Avoid winders in stairs; they are dangerous. Never bisect a rectangular stair landing with a winder. Instead, add the riser to the upper run of the stair, thereby reducing the landing width, which is neither objectionable nor dangerous. Only circular stairs should have winders because they are constantly winding at a uniform rate.

Stairway starting newels, ascending run, should be at second or third riser and never at the first one to avoid passing around or clearing the newel post before ascending. Doors should not open into decending stairways unless there is at least a 2'6" landing between them and the first riser.



d. Avoid partitions between stair runs, wherever possible, because they enclose and shut out the light. Instead, use open wood railings between them, which do not restrict daylight. Stair ceilings should always be sloped parallel with the rake of the stairway; better in appearance and an economy in framing, plaster work, etc.

e. Interior basement stairs, where possible, should be arranged to permit direct ingress and egress from a landing located several steps below the first floor and one above the outside grade or platform.

f. Two basement stairways should not be used in the average dwelling. Basement stairways should not be enclosed in partitions; they exclude daylight and unnecessarily increase building costs.

g. A wood facia board should be placed around the basement stair well upon which to stop the plaster of the stair walls and ceiling using a wood mould to cover the intersection.

51. Hallways:

Avoid both circuitous and center halls; they are invariably dark and usually an uneconomical use of space. Hallways should have windows or skylights for daylight. Through center halls, with a window at each end, are approved. Guard against the loss of floor area in excessive hallways; try always to minimize them.

52. Bedrooms:

a. Bedrooms, Kitchens and Dining Rooms should have cross-ventilation by means of windows in two exterior walls, wherever possible.

b. Basement bedrooms are often essential and frequently an economical use of space. However, their basement location should be limited and contingent upon having approximately full sized windows for light and ventilation.

c. Doors, in opposite walls, should be as near to the same corner of the room as possible to provide maximum wall space for furniture and to permit placing of beds on either of two walls.

d. Where two bedrooms are required, plan one slightly larger than the other as a main bedroom; and where three, one slightly larger and the other two approximately similar in size.

e. One bedroom, at least, should have sufficient wall space, for twin beds.

f. Do not plan or indicate beds with one side against a wall, because, under these circumstances, they cannot be made up without moving them. Always maintain circulation around two sides and foot of a bed for its proper use. The only exception is in the use of bunks.

53. Sanitation, Baths:

a. Sanitation is a prerequisite of good planning. Every building in which there is continuous employment should have its own toilet facilities, with provisions for both sexes where necessary. In the latter

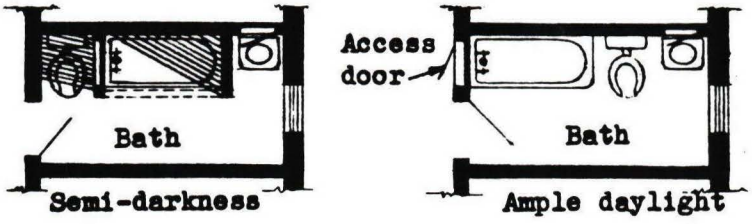
instance the toilet doors are to be located as far apart as possible. Never plan a bathroom or toilet with a door opening directly into a kitchen; an unsanitary arrangement. The Rules and Regulations of all Boards of Health, effective where they have jurisdiction, prohibits this.

b. Where bedrooms occur on both the first and second floors, it is essential to have at least a wash basin and toilet on the floor not having the bathroom, complete with tub. (See Bath Fixtures).

c. Bathrooms should be located over each other and basement laundry trays under the first floor plumbing, where possible, for economy in erecting the piping, etc.

d. Never locate a bath, wash room or toilet where its use necessitates passing through other rooms, nor with its door opposite the front entrance. Creates a bad impression, lacks privacy as well as being otherwise objectionable.

e. The antiquated practice, commonly used in certain localities, of enclosing bath tubs with a stub-partition at each end and a low plaster arch across the front should be discontinued. Added privacy, if that be the reason, is ridiculous because the bath room may be locked. Partially concealing the tub and placing it in semi-darkness, thereby requiring an electric ceiling light for its use, is uneconomical. Do not use projecting stub-end partitions; they reduce the actual size of the bathroom and create a congested appearance.



f. Bath room fixtures should be exposed to view in full daylight for sanitary reasons. The tub should be arranged with its fixture end against a regular partition, not a stubbed one projecting into the room, to provide a small door on the opposite face of the partition for access to the plumbing pipes.

g. Toilet fixtures should never be located on a bedroom partition if it can be avoided, because the noise of their use is disturbing. If unavoidable, then use a sound deadening quilt in the partition against which the toilet fixture is placed.

54. Bath Fixtures:

The class of dwelling under consideration does not require both a separate shower stall and a tub in the same bathroom.

The procedure with reference to bath fixtures, where bedrooms occur on two floors, should be as follows:

a. Provide wash room, with basin and toilet, on first floor, located conveniently to living room for general use, including that of guests.

b. On the second floor there should be a bathroom complete with tub, basin and toilet. If any provision is made for a shower, in addition to tub, it is sufficient to install a shower head and its controls on the wall, over end of tub, with protecting shower curtain.

c. If bedrooms are all on first floor, then the bathroom should be adjacent and complete with tub, basin and toilet, conveniently located for general household use as well as for guests. Shower stalls, 3' x 3', and tubs, 5'0" long are ample.

d. In certain types of buildings, such as bunk houses, shower stalls should be provided; not tubs.

55. Floor Finishing:

a. Particular attention is called to the absolute necessity of protecting finished wood floors from injury and defacement by laying building paper for the workmen to walk upon. Several instances of beautifully finished floors being defaced by cement, plaster and mud footprints is the occasion for remarking upon this matter.

b. The opportunity of displaying the exceptional qualities of wood by choosing high grade, selected material and finishing it so as to display its natural beauty has long been overlooked. Under no conditions put wood to the great disadvantage of horizontal weathering by using it for an exterior floor, such as that of a porch.

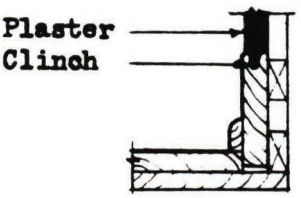
c. Living and dining rooms, hallways, administrative building offices, etc., should have oak, walnut or other marked grain, hard wood floors, finished dark and not light by staining to emphasize the grain, waxing and then rubbing. Random width boards, dowelled, etc., add to the natural beauty of wood flooring.

d. Bedrooms, second floor halls, etc., may be finished light, applying the same treatment.

e. This field is open to a vast improvement in practically all Forest Service buildings.

56. Base boards:

Interior wood washboards, set with showing face flush with finished plaster surface, where interior walls are plastered, are to be preferred both for economy and to avoid dust ledges. A piece of 7/8" x 6" flooring, groove edge up for plaster clinch, will answer very satisfactorily for a baseboard.



57. Furniture Space:

Living rooms should have sufficient wall space for the usual furniture. Entrance halls should have sufficient wall space for a wall table and mirror. See other references herein. Bedrooms should be planned to avoid placing beds under or partly across windows.

58. Closets:

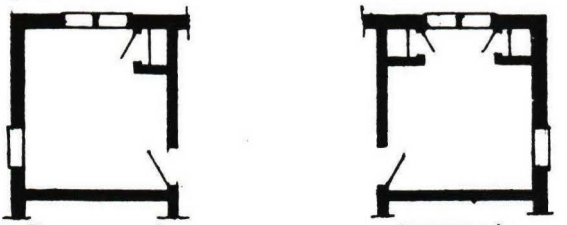
a. Coat closet convenient to main entrance, - one shelf, pin rails, etc.

b. One closet for single bedrooms; where possible, two for master bedrooms.

c. Linen closet of ample size in hall way, adjacent to bedrooms. Shelves full height, or preferably, with shelves above and drawers below. Linen closets should never open into bathrooms for sanitary reasons. Linens absorb odors; especially in times of sickness, contagious diseases, etc.

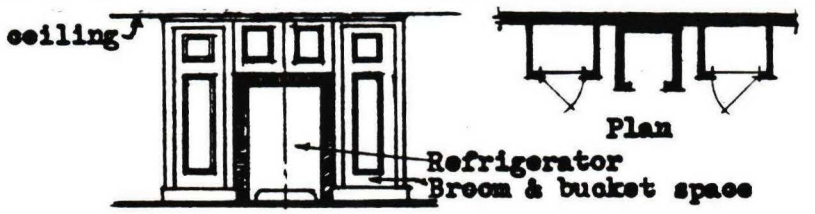
d. Bathroom closet; small, for bath supplies only and not linens.. Frequently built of 7/8" wood, with shelves from floor to ceiling.

e. Closets should not project into rooms making the latter irregular in shape and breaking up the continuity of usable wall surface so essential for furniture, equipment, etc.



f. Large office storage closets should have a window, even if only a small one.

g. A broom closet, having one top shelf, located either in the kitchen itself or in kitchen entry. If neither of these locations are possible, then it may be arranged as a combination cupboard and refrigerator unit.



h. Closets should not project into rooms, unless balanced by a corresponding opposite off-set, because they restrict the use of the room, interfere with furniture arrangement and still more seriously with carpeting.

59. "Built-in" Equipment:

a. Omit kitchen "built-in" ironing boards. Occupants usually do their ironing in the basement laundry. Experienced housekeepers prefer to keep a movable ironing board in a closet to be used where most suitable for personal convenience.

b. Do not include furniture to take the place of a "sideboard" in the dining room or "vanity" tables, etc., in bedrooms. These are personal and all that is necessary is to allow sufficient wall space for them.

60. Vestibules:

a. An entrance vestibule, at the front door, is a practical necessity in windy localities, or where long periods of low temperatures are encountered. Furthermore, it serves the additional purpose of eliminating the

faulty plan having a front door which opens directly into the living room, thereby -

(1) Destroying all privacy because of direct intrusion.

(2) No protection against bad weather.

(3) Source of draughts, causing living room to be continually cold.

(4) Becomes the fore-runner of that type of bad planning in which the side or end of the living room becomes a runway or passage to and from other rooms.

For these reasons the vestibule is not only an essential part of a plan but is a material aid in preventing many other plan defects which occur with its absence.

b. Vestibules should be day lighted. Often, an interesting feature can be made by combining the entrance door with narrow glazed sidelights to furnish daylight. For small vestibules where a window is not possible, be sure to provide glass in the upper part of the entrance door.

61. Kitchens:

a. Kitchens should be planned to avoid passing through intermediate rooms to respond to the front entrance.

b. Kitchens may often be advantageously located at the front of a residence for convenience to and control of the main entrance for quick, convenient service, and to avoid the opportunity of seeing something by those whose time is largely spent there.

c. Kitchens should be located on the Service and Garage side of the building and not always be relegated to the rear. Kitchens at the front are an economy in plumbing where street service connections are to be made.

d. As the work room of the residence, its equipment should be located at windows, preferably two, on exterior walls. Windows should be spacious for abundance of daylight and cross-ventilation. Try to locate kitchens with a window in each of two exterior walls for cross-ventilation. If this is not possible it is wise to install an electric fan for forced ventilation, especially in southern regions where exceedingly hot weather prevails.

e. The sink and drainboard should be at one window, having its sill raised to allow for integral back of sink. There should be closet space on either side of the window. Do not use tile for drainboards because they are very slippery and the cause of breaking dishes unnecessarily. This is true, also, of standard porcelain enamelled iron drainboards and accounts for the custom of placing a rubber mat on them. Linoleum surfaced drainboards, having standard, stock stainless metal edges, are more satisfactory and less expensive.

f. Range should be on other wall near window to receive daylight for its efficient use. Ranges should not be located on dark interior walls necessitating the use of artificial illumination.

g. Refrigerator on a wall away from range and convenient to rear entrance. If electric, its location away from the range to reduce current consumption is essential.

h. Cupboards, closets, etc., may be satisfactorily located on the darkest wall.

62. Breakfast Alcoves, Dinettes:

Where house plans provide for the usual dining room, an additional dinette is superfluous, and, therefore, should be excluded. If no dining room is provided then a dinette or breakfast alcove should be included. Dining spaces are frequently planned so that advantage may be taken of the end of the adjacent living room for either combined usage or for increased area when occasion demands.

a. The purpose of a breakfast alcove is primarily to save time and work. Consequently, it should never be located at the far corner of the kitchen, so that its use not only interferes with the kitchen work, but requires traversing the entire first floor.

b. Today, they often take the place of the former pantry, and, usually, their correct location is between the dining room and the kitchen. This is the most convenient position for its use by those who approach it from either the second floor or the living portion of the first floor. Its service is, of course, from the kitchen on the opposite side.

63. Electrical:

Electric Switch Plates: Frequently, through lack of specific instruction, electric switch plates of incorcorect color or finish are selected for rooms used for

different purposes and, furthermore, they are often carelessly located. Definite information should be given for their correct location either in the general plan notes or in a Specification Clause.

According to the best practice the following rules are observed:

a. Use a dark brown color for rooms generally; Bakelite, dull finished brass, etc., depending upon type of building and allowable cost.

The dark finish is used to make the switch plates visible against papered, plastered and wood wainscoted wall surfaces.

b. Chromium or nickeled finish in kitchens, bathrooms, etc. Chromium finish is preferable, because it corresponds with the finish of the adjacent plumbing fixtures and hardware.

c. White colored switch plates. These should be confined to kitchens, bath and wash rooms. While there should be no differentiation in the sanitation or cleanliness of the various rooms, white finish is often used in conformity with this idea.

d. For bath and wash rooms a stock combination plate having a light switch and convenience outlet for curling irons and electric razors is obtainable.

e. Switch plates should be placed 4'0" to 4'6" above the floor, adjacent to the door trim, knob jamb, and not 12" or more away. Center line of vertical switch plates to be 4" from back of trim and 6" for horizontal gang plates.

f. The switch plate for supply and other electrically illuminated closets should be placed adjacent to the door trim, knob jamb, on exterior wall. More easily seen and does not interfere with the use of the closet shelves.

g. Never place switch plates behind doors. This requires that the plans show the door swings for the assistance of the electrician who should observe them in installing his work.

64. Electric Outlets:

a. Wall receptacles should be placed about 1'6" above the floor and, in order to escape radiators and not to interfere with the use of wall surfaces for furniture, etc., they should be located 1'6" to 2'0" from the corners of rooms to permit the use of extension cords to light fixtures on either wall.

b. In offices, etc., of public or semi-public buildings, wall receptacles should be located to suit pre-arranged furniture, desk or equipment layouts and, under these circumstances, are generally of the floor type or a combination of wall and floor outlets.

c. Never place wall plugs back of radiators. Attention is called to this matter because it so frequently occurs due to the fact that the radiator locations are shown on separate heating plans and not on the general plans.

d. Floor plugs are seldom used in residences and then only for occasional fixtures or purposes.

Utility or convenience outlets should be placed at a convenient height above the floor; about 4'0" high for electric refrigerators, at table height for coffee percolators and toasters and at push table height, or 4'6" above the floor, for electric curling irons, electric razors, etc.

e. Indirect lighting should not be used in Forest Service residences because of the extra cost of the additional current required. For offices, indirect lighting may be considered under circumstances where its use is warranted.

65. Electric Lighting Fixtures:

a. Do not use too many fixtures because they involve both excessive initial expense as well as subsequently for electric current. The latter item is very appreciable where the rates are high.

b. With the introduction and common usage of moveable floor lamps the former custom of installing electric fixtures in living room ceilings has been discontinued, and is no longer considered good practice in residential construction.

c. An electric fixture should be placed in the center of the dining room ceiling to illuminate the dining table.

d. Bedrooms should have center ceiling lights for general illumination which, ordinarily, are turned off after the boudoir lamps are lighted.

e. Offices should have ceiling lights.

f. In bath and wash rooms a single wall electric light should be centered over the medicine cabinet, not centered on one side of its mirror door.

g. Ceiling lights should be located to avoid being broken by swinging doors. Where low ceilings occur, and it is impossible to locate lights elsewhere than above a door, then a special ceiling recess should be provided for the outlet.

h. In laboratores, work rooms, repair shops, etc., convenience outlets should be placed in the work bench top or in the wall just above it, depending upon the character of the work to be performed.

i. For garages, built adjacent to or as part of a residence, the electric lights should be arranged on two-way switches to operate from both the garage and the residence for added convenience.

j. Garage ceiling lights should be located over the motor and not over the cab portion of the motor vehicles. Convenience outlets should be provided on the wall, motor end, for trouble light extension cords at each vehicle location.

k. Waterproof electric fixtures should be placed above exterior entrances, not overlooking rear service doors.

66. Painting, Color:

This subject is too broad to cover in the terse statement form used here, but the following remarks are pertinent:

There is a traditional feeling in the Forest Service that wood should be used in a manner to display its natural qualities and beauties to advantage. This sympathy for material is highly commendable and should be fostered and encouraged. It does not, however, find its correct expression in permitting the entrance doors

of a painted building to remain natural to display the grain of the wood. This frequent occurrence makes the keen observer think the painter overlooked the doors.

Rather, give expression to the use of wood for its natural beauty in a broader way by such methods as the elimination of all interior plastering and substituting natural wood wainscoting and ceilings. Fabricated composition wood products offer excellent, economical, architecturally effective substitutes. Being in full accord with the Forest Service ideals leads to the necessity of emphasizing the great possibilities of wood, providing it is used in the proper manner. In this connection read Floor Finishing.

67. Exterior Painting:

a. The greatest simplicity of colors is imperative. Color schemes consisting of several shades of the same color invariably give the best results and are subject to the least criticism. Exterior painting is governed largely by environment, etc., in the selection of the proper color schemes. Pure white paint is usually too cold and harsh in appearance to be pleasing. Therefore, in using it, add enough ochre to give a warm ivory or cream white.

b. Outside surfaces of frame buildings should never be painted green. It is particularly unfortunate when combined with a roof stained green. Buildings painted brown are in the same category. Fortunately, in many instances, this mistake is being rectified by repainting a cream white.

c. White painted frame buildings should not be outlined at corners with vertical stripes of green, or vice-versa. Exterior of entrance doors should be painted white, when the building itself is that color; not stained natural or painted brown as sometimes occurs.

d. Window and door screens should agree with color of window and door trim.

e. Log structures, or those covered with shakes or shingles and stained brown, should not have doors, window or door trim, shutters or corner posts painted a white or green color. They should be stained natural like the logs. Should it be necessary to paint these portions, then use a color which is just a shade darker than the color of the logs to harmonize with them.

f. Metal gutters and downspouts, unless of copper, should be painted to agree with the color of the cornice, wall surfaces, etc., to which these features are attached.

For example, to paint them green on cream colored buildings, due to desire of the painter to emphasize them, is a serious mistake which has been frequently observed.

Metal ridge rolls should be painted to exactly match the color of the roof of which it is a part; not some other contrasting color as often occurs.

g. Chimneys of red brick, projecting from roofs of another color, are most distracting. If, unfortunately, the chimney is of red face brick and the building itself is of frame and painted a white, buff or cream color, then the chimney should be painted to match.

h. Brick buildings of certain Spanish periods have their exposed exterior brick surfaces painted white. In regions where brilliant sunshine prevails and where tile roofs are customary, white exterior walls are very appropriate and provide a pleasing contrast to the red tiles.

i. If the wall faces of basement window areas are whitewashed they will reflect considerably more daylight into the interior of the building.

68. Interior Painting:

a. There is an excellent opportunity for variety in colors for interior painting, not only on account of the different rooms but also because there is no controlling natural factor such as environment; always a consideration in determining exterior color schemes.

b. Wood wainscoting, wood ceilings, window and door trim, etc., of living rooms, entrance halls, offices, etc., may be stained or treated in other ways to emphasize the grain of wood. French gray, Pompeian red, or apple green are attractive and serviceable colors for kitchens and breakfast alcoves, while ivory or cream white is cheerful and sanitary for bedrooms and baths.

c. For interior plaster surfaces, where wall paper is not used, light buff, peach or delicate nile or jade green shades are very appropriate.

d. The interiors of buildings occupied exclusively by men, such as bunk houses, offices, etc., should never be painted in delicate colors.

e. Painted Plaster:

Plaster surfaces of offices, etc., are ordinarily painted with oil paint, using delicate tints to reflect light.

The interior walls and ceilings of repair shops, garages, etc., should be painted white to reflect the maximum of light.

To take the wear, to conceal finger marks, etc., a dark gray or maroon colored dado or base, about 4'0" high, will be found very serviceable. For corridors and offices a similar dado is often used in the best work.

For this purpose there are a variety of paints on the market, especially prepared for surfaces of different materials.

f. In repair shops, laboratories, work rooms, locker and wash rooms, and similar locations, where the work is of such a nature that the walls become disfigured, it is advisable to use a dark colored painted dado. French gray, maroon or other dark colors having good hiding qualities, are recommended for this purpose and should be applied to a height of 4' or 4'6" above the floor.

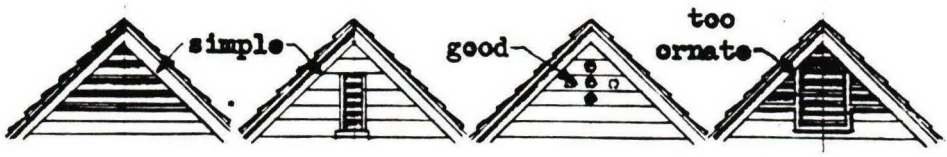
For administrative offices, etc., conforming to the usual office building practice, a painted dado is applied between the baseboard and the wood chair-rail; all easily renovated by additional applications, whenever necessary.

g. The interiors of repair shops, warehouses, etc., in which the daylight is partly absorbed by the brownish color of their unfinished natural wood linings,may be greatly improved by several coats of white paint in conformity with the accepted practice used in private industrial establishments. It is surprising how much brighter otherwise dark interiors, especially in one story structures where the underside of the roof is exposed to view, may be made by spraying white paint which reflects daylight.

Greater efficiency results from the increased visibility, reduced eye-strain and greater facility under which the work may be done. Incidentally, less dirt and rubbish accumulate in bright, clean rooms, work spaces, etc., be - cause it is more evident, not to mention the better morale established by the improved working environment.

69. Vents:

a. Attic spaces, between ceilings and under side of roofs, should be provided with ventilation to prevent dry rot and to aid in keeping the lower rooms cool in hot weather. Provide wood frame with slat vents or louvres, located usually in gable ends, of simple pattern without undue emphasis, to create an air circulation. Screen wire and frame should be placed on inside face to keep birds, etc., out. Often an extra, short length of terra cotta flue lining, built into chimney, makes an excellent vent.



b. Soil and climatic conditions likewise necessitate venting the space between grade and first floor of buildings having no basement. In stone or concrete foundations, holes should be provided in opposite walls for vents. Structural tile, 4" x 12", outside edge set 1" in from exterior face of wall, makes very satisfactory vents. Small mesh screen wire should be fastened over opening, on inside face, to keep out rodents.

c. Barns should have the usual standard type roof ventilators. Stock, louvred, metal ventilators, unless copper, require regular painting to prevent their deterioration.

Note: In cold climates attic wall vents should have hinged glazed sash inside for closing. Also, if stock metal, louvred, adjustable vent and frame is not used, a removable wood plug should be provided to close basement wall vents.

70. Lattice:

This decorative form of light wood construction, of frequent occurrence in some regions, is more ornamental than useful. If used at all it should be in a very limited manner only. Seldom, in all the instances where it has been observed, has it been the support of a vine or a bush. Ordinarily, its use is not recommended.

71. Porches:

Actual observation of many Forest Service buildings raises a question concerning the necessity of a porch. Frequently, they show indications of serving little or no use.

For instance, Administration Office buildings invariably have a porch; yet those who work inside have neither the time nor any opportunity or occasion to use it. Neither is it required for the public whose business is transacted indoors and not on the porch. This particular class of buildings may often be designed without one to greater advantage in both appearance and economy.

In spite of the fact that, in some regions, no administration building is considered complete without a porch, yet they are decidedly improved and possess much more administrative character without them.

Types:

a. Two stories high, projecting, open and purely ornamental, like Mt. Vernon, Va., affording no protection against sun, rain or snow.

b. Small, approximately square, entrance porches do not serve in the true sense of such a feature because they are really only thoroughfares, roofed for protection.

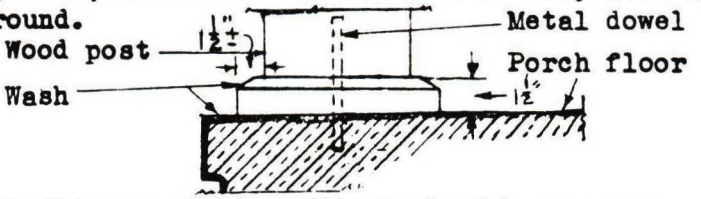
c. A serviceable porch is one, located apart from the entrance itself, either first or second story, possessing privacy and serving as a place for relaxation, recreation, etc. Somewhat narrow, either recessed or overhanging, second story porches of the Monterey type afford the opportunity for an inexpensive, useful feature, which, at the same time, creates a pleasing architectural effect.

d. Porches should be used only in localities where their use is customary and those which project should be covered by a roof similar to and in keeping with that of the building proper. Location for exposure varies with climatic conditions; whether northern or southern.

e. Ceilings of small, square entrance hoods or stoops should be kept as low as possible by locating them just above the trim over the door head. Larger porches, full length of building front, may well have slightly higher ceilings.

f. Floors and Steps: If of wood they are not permanent and become a source of continual maintenance because of the constant painting required for their preservation. While the initial cost may be cheap, their use is excused only where funds are insufficient for more permanent construction.

g. Porch Posts: They should not be too numerous. Never place a post on the center line of the porch; that is where an opening should occur. Provide wood pilasters, or partial posts, at wall faces of frame buildings, in line with the exterior corner porch posts, to receive and give apparent support to the porch beam above. In connection with masonry buildings, use a masonry pier or a stone or brick corbel to agree with building proper. Exterior wood posts should be seated upon a raised stone or cement base, 1" or 1½", to prevent deterioration from rain water and dampness. This applies also to wood posts in basements, storage buildings, sheds, etc., or other instances where they rest upon the ground.



h. Porch Railings: Wood railings should never be erected with the bottom wood member resting upon the floor. Impractical and subject to immediate decay. A 3" or 4" opening should always be maintained for the drainage of rainwater, etc., from the porch floor.

i. Roofs: To obtain the necessary drainage slope for porch roofs it may well be remembered that the porch openings may be as low as 6'8" from the floor to the soffit of the ceiling beam above. This height is equivalent to that of the interior doors and therefore ample. Porch roofs should, in design, agree with those of building proper. The space between the ceiling and roof should be ventilated by creating an air circulation. This is often accomplished by boring 3/4" diameter holes in opposite ends of the ceiling.

72. Terraces:

a. Serve two general purposes; either the stone floored type for open-air rest and recreation adjoining residences, etc., or those built up of earth and grass covered and used to elevate buildings above the surrounding natural grade.

For some unknown reason, there seems to be a prejudice against or a tendency not to use terraces for the latter purpose around Forest Service dwellings, even when obviously necessary and desirable. Where sites are naturally low, sometimes depressed below adjacent highways, etc., it is logical to take advantage of the possibilities of terracing around buildings to offset their otherwise unduly low setting. Such terraces should be built with broad, rather than narrow, top surfaces, graded away from buildings at the rate of 1/4" per foot, with sloping surfaces not less than two feet in length for each foot of rise.

b. The stone flooring of terraces is most appropriate when built of flagstone laid with cement mortar joints of varying widths; a variation resulting solely from the different shaped stones, over a 4 inch thick concrete fill or a 6 inch, well tamped cinder fill. Terrace floors should have a slight slope away from building for drainage.

To offset the injurious effects of frost action, by allowing it to take place without disturbing or heaving the stones, loose sand joints may be used. Ordinarily, however, sand joints are undesirable. Read Section 23 herein on "Porch Floors and Walks" in this connection.

c. Where stone floors are laid in the open portions of shelter buildings sand-joints are particularly objectionable. The sand, being walked upon, scratches and mars the stones themselves, creates the appearance of negligent maintenance and is dangerous because sand on stone is slippery. If the effect of a sand joint is desired it should be obtained by permanently embedding a dusting of sand over the cement mortar joint and then brooming all loose sand off.

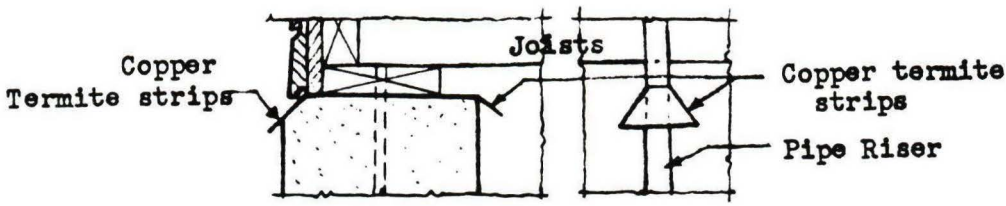
73. Finished Grade:

In all cases the finished grading should have a light slope away from building for natural drainage.

74. Termite Proofing:

Because Forest Service buildings are usually built of wood, the necessary precautions should be taken to protect them against termites in those localities where they are prevalent. A simple method consists

of erecting continuous sheet copper strips along all foundation walls, including full sheet copper shields on all pipe risers, etc., which contact the ground.



In addition, all lumber and woodwork up to and including the underside of the flooring should be thoroughly impregnated by a standard pressure process, using a recognized preservative. If a pressure treatment is not available, then apply the preservative by means of a brush.

Any woodwork cut or scarred after the application to be recoated to insure the full effectiveness of the treatment.

(See Provisions for Building Codes for Insuring Protection from Termites & Decay by T. E. Snyder, Sen. Entomologist, Bureau of Entomology & Plant Quarantine, U. S. Department of Agriculture.)

75. Fences, Gates:

Great care should be exercised to determine the type of fencing best suited to harmonize with both the buildings and the natural surroundings.

a. For frame buildings painted a light color such as silver gray, cream white, etc., the fencing should correspond and consist of vertical palings, surfaced for painting, with the intermediate open spaces not exceeding their width.

In connection with a small group of buildings in or on the outskirts of towns or villages, this type of fencing may be used very successfully to tie them together to prevent their appearing detached. Obviously, in remote locations, long stretches of this type of fencing are unnecessary and out of place.

Montpelier Ranger Station, Region 4, offers a good example of the successful use of such a fence connecting its storehouse and barn.

b. Where log, redwood siding, shake or cedar bark covered buildings occur, having a natural or stained finish, the fencing should consist of natural log posts and poles to correspond.

The fencing at the Redwood Ranger Station, Region 6 and that surrounding the corral, at the Remount Depot, Region 1, are both of this type and very suitable for their respective purposes.

c. Wire fences, with angle iron posts of the industrial type like that used at the Pueblo, Colorado Warehouse, Region 2, are very satisfactory for storage yards at Repair Shops, Equipment Depots, etc., but generally inappropriate in connection with dwellings. However, the exception occurs in arid or semi-arid regions, where there is little or no foliage or vegetation and sand predominates, this type of fencing is very satisfactory and appropriate. The site and environment are such that this fencing is inconspicuous, yet practical, and harmonizes where other heavier fencing does not. An excellent example is that of the Quyama Ranger Station, Region 5.

d. Metal fencing, to enclose repair shop and warehouse properties, on the outskirts of towns and not in residential districts, is often the most satisfactory kind.

e. Gates should correspond with the types of fencing in connection with which they occur. Fence heights vary with the respective types used for definite practical purposes, such as around corrals, etc., but, as ordinary indicators of property boundaries, they should not be too high. Do not combine several types of fencing at the same site.

76. Garages:

a. Garages should be located on the Kitchen or Service side of buildings, both for service and convenience, and economy in walks, etc.

b. Garages should not have man-doors opening directly into residences to avoid fume and fire hazards. They may be placed very advantageously at the far side of a small, open, rear service or kitchen porch.

c. When located in a Basement, or where habitations are directly above, provide a cement plaster ceiling on metal lath, or similarly fireproofed construction.

d. Whether a frame or masonry building, provide a masonry wall between the residence and the attached garage.

e. Garage floors should be at least four inches above the outside finished grade and sloped for drainage.

f. An exterior concrete apron, about 2'6" wide, sloped from floor to grade, to exclude rain water, full width of Garage entrances, should always be installed.

77. Gasoline Pump Units:

This subject is of vital importance and one requiring serious attention. In many localities gasoline pump units have been made unnecessarily conspicuous, both in color and location. Further pertinent information on this special subject will be found available in "Gasoline Pump Units with suggestions regarding their location and installation".

78. Forest Service Emblems:

a. The pine tree, as a painted insignia, gig-sawed out of wood or in other decorative forms, has become a recognized Forest Service emblem. Refrain from employing pine trees of different sizes in the same composition to eliminate the "old and young" or "father and son" conflict which always results in design when using the same motif at different scales.

b. The pine tree emblem should be used sparingly. The effect created by their repeated use in the same building is very unfortunate, resulting in their loss of all Forest Service significance.

79. Repair Shops.

a. Shop Offices: In a well planned Repair Shop, just as in an Administration building, offices, without exception, should be located to control the entrance, to have complete surveillance of the work area and the Accessory or Parts Departments. Because of the vital necessity of maintaining an inventory of the

accessories, whether a running inventory or not, the office should either be a part of or immediately adjacent to the Parts Department. If located in a frame structure, it is essential to entirely enclose the office portion with wood and glass partitions continued to the ceiling, and, to preserve sufficient quiet for efficient work, some form of insulation should be installed within them to absorb and exclude the noises of repair work, moving vehicles, etc., eminating from the Shop proper.

b. Work spaces, etc., should be planned in sequence of operation in accordance with a pre-determined routing plan established by a competent authority on the particular class of shop work to be done.

c. Forest Service repair shops should not have windows of a type or isolated arrangement which produce a residential appearance. The use of saw tooth skylights, monitors, etc., should not be overlooked. See Section 41, "Daylighting".

d. Major Repair Shops, located usually in cities or towns for convenience in obtaining skilled labor, accessories, special parts, etc., not kept in stock, should be designed after the fashion of the modern commercial shop and in accordance with the best engineering practice.

e. Precision Rooms should be located, preferably, in a corner of the building, to receive daylight from windows in two walls. The precise and exact work done in efficiently conducted Precision Shops necessitates the elimination of noise and dust. Consequently this work space should be entirely enclosed by continuing the interior partitions to the ceiling and, if of frame construction, installing some form of sound deadening quilt within them.

f. Tire Storage should not be on the main floor where the space is much more valuable for other purposes. Basement tire storage is better practice, especially in southern regions where hot weather dictates their storage in a cool place. In more temperate climates, where extremely hot weather does not occur, or where no basement exists, tires may be stored in a mezzanine or second floor level.

Frequently, in connection with Repair Shops, an open balcony occurs over the various first floor rooms along the side or ends of the shop space proper which may be found very serviceable for tire and accessory storage purposes.

g. Especially constructed independent foundations should be provided for Laboratory balance tables where delicate, precise weighing is done as well as for very heavy pieces of vibrating machinery. Punches, presses, etc., should have separate foundations, with a full depth expansion floor joint all around, to prevent the cracking of the adjacent concrete due to their use.

h. Ample yard storage space, for motorized equipment, is of as much importance as the shop buildings themselves. The frequent sight of adjacent streets being used for this purpose, indicative of inadequate facilities, is a definite challenge to the rectification of this inefficient condition at the earliest opportunity.

80. Loading Platforms:

Loading and unloading platforms for warehouses, etc., should be placed on the exterior, recessed for protection against the weather, rather than the interior, to conserve floor space. A flight of narrow steps, also recessed in order not to project into the vehicle space, should be provided at one end for direct access from grade. Separate loading and unloading platforms are often found advantageous. See Section 24, "Exterior Platforms, Steps."

81. Enclosures:

a. The usual orderly, cleanly appearance of Forest Service premises is noteworthy, as a consequence of which the occasional, ill-kept one attracts attention.

b. In connection with Repair Shops and similar buildings where there is a gradual accumulation of discarded parts, pieces of useless equipment, junk, odds and ends, etc., some practical consideration should be given to prevent their disfiguring the otherwise neat and orderly appearance of the premises.

b. A simple, inexpensive and inconspicuous provision consists of laying a concrete slab or floor adjacent to a building, at the rear of the property and open to the sky. It should be surrounded with man-high French or similar fencing made of 1½" or 2" diameter vertical sticks wired together and provided with a gate. The finished concrete floor should be placed one step above the surrounding grade and sloped for drainage. Roseburg Repair Shop, Region 6, is a representative example.

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